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FINAL REPORT

April 30, 1969

GROSS PROCESS UNDER DIFFERENT CONDITIONS OF SUCCESS AND FAILURE

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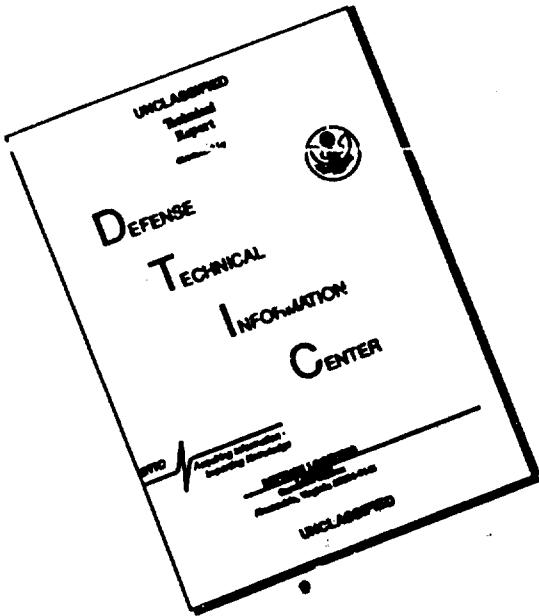
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GROUP PROCESS UNDER DIFFERENT CONDITIONS OF SUCCESS AND FAILURE

Contract Nonr-1866(43)  
November 1, 1960 - April 30, 1969

The following report includes a brief general summary of the research carried out in this Contract, a list of associated professional staff, and a list of publications, technical reports, and theses supported by the Contract. Other activities such as conferences and foreign travel are described.

Although this is a final report on the above contract, work continues under a new Contract, N00014-67-A-0298-0024, until April 30, 1970.

The original goals of this research were to examine patterns of social interaction in small groups under different conditions of success and failure. Specifically, it was shown that social responses in groups could be manipulated by making rewards contingent upon particular patterns of interaction. For example, the degree to which an individual took initiative or leadership in decision making in a 3-person group could be increased if the outcome of the decision was to achieve reward. Other patterns of group behavior that were similarly investigated were: disagreement in decision making and speech sequences.

The small group experimental studies were expanded to include the use of physiological measurements in assessing group interaction and the physiological consequences of specific roles and group role composition. It was shown, for example, that failure in a group in a given task resulted in slower habituation of physiological arousal, as measured by skin potential level, as compared to success. Persistent arousal was more likely in roles characterized by uncertainty or ambiguity. Similar psychophysiological methods were used to compare the responses of individuals to social or group situations versus conditions of social isolation. A symposium in this area held in 1963 and published in 1964 served to facilitate further developments of this kind of work and led to the inclusion of a new chapter in the 1969 revision of The Handbook of Social Psychology. The chapter is entitled "Psychophysiological approaches in social psychology," by David Shapiro and Andrew Crider.

In the process of developing psychophysiological methodology useful in small group research, a number of technical and methodological problems had to be solved in the following areas: automatic processing of physiological data, mathematical analyses of physiological time trends, interrelation of physiological, verbal, and behavioral indices.

Early in the contract, several new directions of the research took place. The major development was research in the direct manipulation of autonomic responses by techniques of providing feedback and reinforcement contingent upon such responses. Our first publication in 1964 (Shapiro, Crider, and Tursky) showed that skin potential responses could be increased by operant reinforcement and that these changes were independent of other autonomic indices. This research was among the first to open up a new approach to autonomic behavior and has broad implications for learning theory, practical implications for the treatment of psychosomatic disorders, and also provides

alternative means of influencing performance by directly modifying associated physiological correlates of the performance.

Current work in the project is concerned with (a) studies in the control of autonomic responses by feedback and reinforcement, (b) studies in the consequences of autonomic functions for different kinds of human performance. In regard to the first area, the research has been extended to studies in the control of blood pressure and heart rate. These measures are probably of more central medical and behavioral significance than electrodermal activity. In regard to the second area, several studies have been completed showing that autonomic activity is nicely graded as a function of the difficulty of a paced mental task. Studies of physiological correlates of reaction time and other behavior are also in progress.

Professional Staff

Current	David Shapiro, Ph. D., Principal Investigator Bernard Tursky, Instrumentation Engineer Susan Shnidman, Ph. D., Associate Investigator	1960- 1960- 1967-
Former	P. Herbert Leiderman, M. D., Co-Principal Inv. Andrew Grider, Ph. D., Associate Investigator	1960-1963 1963-1968

Publications

Levin, G., & Shapiro, D. The operant conditioning of conversation. J. exp. Anal. Behav., 1962, 5, 309-316.

Tursky, B., Leiderman, P. H., & Shapiro, D. A system for recording and processing psychophysiological and behavioral data. Psychophysiology Newslet., 1962, 8, 24.

Arsenian, J., Semrad, E. V., & Shapiro, D. An analysis of integral functions in small groups. Int. J. Group Psychother., 1962, XII, 421-434.

Leiderman, P. H., & Shapiro, D. Application of a time series statistic to physiology and psychology. Science, 1962, 138, 141-142.

Zinberg, N. E., & Shapiro, D. A group approach in the contexts of therapy and education. Ment. Hyg., 1963, 47, 108-116.

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Semrad, E. V., Kantor, S., Shapiro, D., & Arsenian, J. The field of group psychotherapy. Int. J. Group Psychother., 1963, 13, 452-475.

Shapiro, D. The reinforcement of disagreement in a small group. Behav. Res. Ther., 1963, 1, 267-271.

Group learning of speech sequences without awareness. Science, 1964, 144, 74-75.

Shapiro, D., Crider, A., & Tursky, B. Differentiation of an autonomic response through operant reinforcement. Psychon. Sci., 1964, 1, 147-148.

Shapiro, D., Leiderman, P. H., & Morningstar, Mona E. Social isolation and social interaction: A behavioral and physiological comparison. In J. Wortis (Ed.). Recent advances in biological psychiatry. Vol. VI. New York: Plenum Press, 1964.

Shapiro, D., & Leiderman, P. H. Studies on the galvanic skin potential level: Some statistical properties. J. psychosom. Res., 1964, 7, 269-275.

Leiderman, P. H., & Shapiro, D. Studies on the galvanic skin potential: Some behavioral correlates. J. psychosom. Res., 1964, 7, 277-281.

\_\_\_\_\_, (Eds.), Psychobiological approaches to social behavior. Stanford: Stanford Univer. Press, 1964.

Shapiro, D., & Leiderman, P. H. Acts and activation: A psychophysiological study of social interaction. In P. H. Leiderman & D. Shapiro (Eds.), Psychobiological approaches to social behavior. Stanford: Stanford Univer. Press, 1964.

Shapiro, D. Discussion of Dr. Zahn's paper. Psychiatric Research Report #10. American Psychiatric Association, 1964.

Tursky, B., Shapiro, D., & Leiderman, P. H. Automatic data processing in psychophysiology: A system in operation. Behav. Sci., 1966, 2, 64-70.

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Baron, J. An EEG correlate of autonomic discrimination. Psychon. Sci., 1966, 4, 255-256.

Tursky, B., Shapiro, D., & Leiderman, P. H. The effect of electronic devices on research behavior. In H. Zimmer (Ed.). Computers in psychophysiology. Springfield, Ill.: Charles C. Thomas, 1966.

Tursky, B., Leiderman, P. H., & Shapiro, D. A system for recording and processing psychophysiological and behavioral data. In H. Zimmer (Eds.), Computers in psychophysiology. Springfield, Ill.: Charles C. Thomas, 1966.

Shapiro, D., & Leiderman, P. H. Arousal correlates of task role and group setting. J. pers. soc. Psychol., 1967, 5, 103-107.

Birk, L., Crider, A., Shapiro, D., & Tursky, B. Operant electrodermal conditioning under partial curarization. J. comp. physiol. Psychol., 1966, 62, 165-166.

Shapiro, D., & Birk, L. Group therapy in experimental perspective. Int. J. Group Psychother., 1967, 17, 211-224.

Shapiro, D., & Crider, A. Operant electrodermal conditioning under multiple schedules of reinforcement. Psychophysiology, 1967, 4, 168-175.

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Kahneman, D., Tursky, B., Shapiro, D., & Crider, A. Pupillary, heart rate, and skin resistance changes during a mental task. J. exp. Psychol., 1969, 164-167, 79.

Shapiro, D., Tursky, B., Gershon, E., & Stern, H. Effects of feedback and reinforcement on the control of human systolic blood pressure. Science, 1969, 163, 588-590.

Shnidman, Susan. Avoidance conditioning of skin potential responses. Psychophysiology, in press.

Crider, A., Schwartz, G. E., & Shnidman, Susan. On the criteria for instrumental autonomic conditioning: A reply to Karkin and Murray. Psychol. Bull., in press.

Shapiro, D., & Schwartz, G. E. Psychophysiological contributions to social psychology. In preparation for publication in Annual Review of Psychology, 1970.

#### Technical Reports

1. The operant conditioning of conversation. August, 1961.
2. The reinforcement of disagreement. September, 1961.
3. A behavioral and physiological approach to the study of group interaction. December, 1961.
4. A system for recording and processing psychophysiological and behavioral data. December, 1961.
5. Social Isolation and social interaction: A behavioral and physiological comparison. January, 1963.
6. Some factors affecting disagreement in a small group. January, 1963.
7. Studies on galvanic skin potential level: Some behavioral correlates. March, 1963.
8. Studies on galvanic skin potential level: Some statistical properties. April, 1963.
9. A study of some relationships between reinforcement and physiological responses. February, 1964.
10. Action and activation: A psychophysiological study of social interaction. January, 1965.

11. Automatic data processing in psychophysiology: A system in operation. February, 1965.
12. The influence of social role on autonomic and subjective responses. February, 1965.
13. Studies on the reinforcement of spontaneous electrodermal activity. June, 1965.
14. Operant electrodermal conditioning under multiple schedules of reinforcement. November, 1966.

Theses partially supported by this contract

Levin, G. The operant conditioning of a social response. Unpublished doctoral dissertation, Boston University, 1961.

Morningstar, Mona E. A study of some relationships between reinforcement and physiological responses. Master's thesis, Northeastern University, Boston, 1963.

Crider, A. Sensory input, activation, and performance in schizophrenia. Unpublished doctoral dissertation, Harvard University, 1963.

Dubitsky, Mildred. Psychophysiological arousal and operant autonomic conditioning. Unpublished doctoral dissertation, Harvard University, 1966.

Baron, J. Discrimination of phasic physiological arousal. Undergraduate honors thesis, Harvard College, 1966.

Lehrer, P. The effect of muscular relaxation and muscular tension on the extinction of the unconditioned autonomic response to electric shock. Unpublished doctoral dissertation, Harvard University, 1969

Symposium

A symposium entitled "Psychobiological Approaches to Social Behavior" was held on April 19 and 20, 1963, at Holyoke Center, Harvard University. Papers were presented by K. Back and M. Bogdonoff; A. Couch; H. Gerard; M. Horwitz; H. Kaplan, N. Burch, and S. Bloom; H. Lennard, G. F. Mahl, J. Mason and J. Bracy; V. Nowlis, A. Rapoport, S. Schachter, J. P. Scott, D. Shapiro and P. H. Leiderman.

Also in attendance were J. R. Ewalt, P. B. Dews, A. Levine,  
R. Trumbull, G. Tolhurst (ONR). (Harvard)

The results of the meeting were published in Psychobiological approaches to social behavior, edited by P. H. Leiderman and D. Shapiro, Stanford University Press, 1964.

Foreign Travel

1. Summer 1961 - P. H. Leiderman and D. Shapiro

Visits to psychological and psychiatric research facilities in Europe and participation at XIV International Congress of Applied Psychology in Copenhagen and VI International Congress on Mental Health in Paris. Papers presented.

See detailed report, September 20, 1961.

2. Spring 1968 - D. Shapiro

Visit to psychophysiological laboratories in Japan.

Detailed report to Dr. John Nagay, June 3, 1968.